

## CLAIMS

What is claimed is:

1. An apparatus for synthesizing a carbon nano-material, comprising:
  - a reaction gas supplier for supplying a reaction gas in isolation from atmospheric condition;
  - a metallic catalyst supplier for supplying a metallic catalyst in isolation from atmospheric condition;
  - a reactor communicating with the reaction gas supplier and the metallic catalyst supplier and providing a space for synthesis of the carbon nano-material;
  - a heating means, positioned outside the reactor, for heating the reactor to a temperature proper for the synthesis of the carbon nano-material; and
  - a collecting means for collecting the carbon nano-material generated in the reactor.
2. The apparatus of Claim 1, wherein the reaction gas is methane, ethylene, acetylene, carbon monoxide, cyclohexane, benzene, or xylene.
3. The apparatus of Claim 1, wherein the metallic catalyst is metal nitrate.
4. The apparatus of Claim 1, wherein the reactor is a tube made of quartz.
5. The apparatus of Claim 1, wherein the heating means is a surface flame burner.
6. The apparatus of Claim 1, further comprising a reflector for reflecting heat provided by the heating means toward the reactor.

7. The apparatus of Claim 1 or 4, wherein the reactor extends in a helical form.
8. The apparatus of Claim 1 or 4, wherein the reactor extends in a zigzag form.
9. The apparatus of Claim 1, wherein the collecting means further comprises:  
a charging unit communicating with the reactor, in which the produced carbon nano-material is electrically charged; and  
a separation unit communicating with the charging unit, provided with a pair of plates, which are connected to a direct current power source, wherein each of the plates has an electric polarity different from each other.